

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1-10. (Canceled).

11. (New) A chip removal apparatus to remove residue such as chips that have remained in and adhered to an interior of a bag-shaped machined hole in a work piece, the chip removal apparatus comprising:

a chip removal air blow nozzle provided with a spiral flow creating portion which is arranged in a distal end thereof and having a plurality of guide pieces formed in a twisted shape so as to change air flow flowing therein into a spiral flow;

a tubular member in which the chip removal air blow nozzle is inserted; and

a guide provided on a distal end of the tubular member, the guide having a penetration hole that the distal end of the chip removal air blow nozzle penetrates, the guide being arranged to contact the work piece so as to surround the bag-shaped machined hole while the distal end of the chip removal air blow nozzle is inserted into the bag-shaped machined hole.

12. (New) The chip removal apparatus according to claim 11, wherein:

the plurality of guide pieces forms three notch portions;

the three notch portions are formed at 120° intervals around an axial direction of the chip removal air blow nozzle;

the three notch portions are inclined at an angle of between 30° to 45° relative to the axial direction; and

the three notch portions have lengths in a range of 4 mm to 6 mm from the distal end of the chip removal air blow nozzle.

13. (New) The chip removal apparatus according to claim 11, further comprising:
an air supply block that supports a bottom of the chip removal air blow nozzle;
an air supply hose that supplies air to the chip removal air blow nozzle through the air supply block;

a main block which is joined with the air supply block and includes an aperture portion formed therein;

an ejector member which is joined with the main block and is formed with an ejector chamber and an ejector hole, the ejector chamber communicating with the aperture portion, and the ejector hole communicating with the ejector chamber;

a recovery air supply hose which supplies air to the ejector hole; and

a discharge hose that is connected to the ejector member so as to communicate with the ejector chamber,

wherein the tubular member comprises:

an outer cylinder connected to the main block, an inside of the outer cylinder communicating with the aperture portion; and

an inner cylinder slidably provided in the outer cylinder, an inside of the inner cylinder communicating with the inside of the outer cylinder,

wherein the chip removal air blow nozzle passes through the aperture portion, the inside of the outer cylinder, and the inside of the inner cylinder, such that the spiral flow creating portion is exposed out from a distal end of the inner cylinder.

14. (New) The chip removal apparatus according to claim 13, wherein the tubular member further comprises:

a spring which urges the inner cylinder such that the inner cylinder protrudes from the outer cylinder; and

an engaging portion which prevents the inner cylinder coming out from the outer cylinder.

15. (New) The chip removal apparatus according to claim 13, further comprising:
a valve which is connected to the air supply hose and intermittently supplies the air to the chip removal air blow nozzle.